

AN AIR-CONDITIONING SYSTEM FOR THE PASSENGER COMPARTMENT
OF A VEHICLE

TECHNICAL FIELD

5 The present invention relates to an air-conditioning system for the passenger compartment of a vehicle.

The present invention finds advantageous application in an air-conditioning system for the passenger compartment
10 of a motor vehicle, to which the ensuing treatment will make explicit reference without this implying any loss of generality.

BACKGROUND ART

15 In modern motor vehicles there is always present an air-conditioning system, which is designed to condition the passenger compartment introducing into the passenger compartment itself air at the temperature desired by the user. For this purpose, the air-conditioning system
20 comprises a unit for treatment of the air, which is designed to heat or cool the air that is subsequently introduced into the passenger compartment by a series of ventilation outlets made in the passenger compartment itself.

25 Normally, inside the passenger compartment, the ventilation outlets are arranged at different levels so as to enable introduction of the air into different areas of the passenger compartment itself. In particular, there are by now always present top
30 ventilation outlets designed to direct air towards the internal wall of the windscreen, intermediate ventilation outlets designed to direct the air towards the driver's body and the body of the passenger
35 occupying the front seat, and bottom ventilation outlets

designed to direct the air towards the feet of the driver and of the passenger occupying the front seat. Typically, only the intermediate ventilation outlets are mobile so as to enable regulation of the direction of the air introduced into the passenger compartment, whilst the top and bottom ventilation outlets are fixed and do not enable regulation of the direction of the air introduced into the passenger compartment.

10 DISCLOSURE OF INVENTION

The purpose of the present invention is to provide an air-conditioning system for the passenger compartment of a vehicle, which will be easy and inexpensive to produce and, at the same time, will provide the driver or the passenger occupying the front seat with a wider range of possibilities of regulation of the air introduced into the passenger compartment.

In accordance with the present invention, an air-conditioning system for the passenger compartment of a vehicle is provided according to what is specified in Claim 1 and, preferably, in any one of the subsequent claims depending directly or indirectly upon Claim 1.

25 BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be described with reference to the annexed plate of drawings, which illustrates a non-limiting example of embodiment thereof, and in which:

- 30 • Figure 1 is a perspective and schematic view of a bottom portion of the passenger compartment of a motor vehicle provided with the air-conditioning system forming the subject of the present invention; and
- Figure 2 is a partially sectioned side elevation of a detail of Figure 1.

BEST MODE FOR CARRYING OUT THE INVENTION

In Figure 1, the reference number 1 designates the passenger compartment of a motor vehicle provided with an air-conditioning system 2, which comprises an air-treatment unit 3 housed in a engine compartment (not illustrated) and designed to treat the air that must be introduced into the passenger compartment 1. Connected to the air-treatment unit 3 is a plurality of ventilation outlets 4, which have the function of introducing into the passenger compartment 1 the air treated by the air-treatment unit 3, are distributed inside the passenger compartment 1, and are arranged at different levels in order to enable introduction of air into different areas of the passenger compartment 1 itself. In particular, the ventilation outlets 4 comprise: top ventilation outlets 4 (not illustrated in detail) designed to direct the air towards the internal wall of a windscreen; intermediate ventilation outlets 4 (not illustrated in detail) designed to direct the air towards the body of the driver and the body of the passenger occupying the front seat; and bottom ventilation outlets 4 (illustrated in the attached figures) designed to direct the air towards the feet of the driver and of the passenger occupying the front seat.

The air-conditioning system 2 comprises a tubular body 5, which is set in a bottom portion of the passenger compartment 1, has an internal pipe 6 communicating with the air-treatment unit 3, and is provided with a number of bottom ventilation outlets 4 mounted on the side surface 7 of the tubular body 5 itself. In particular, the ventilation outlets 4 are mounted on the tubular body 5 so as to be able to oscillate about a longitudinal central axis 8 of the tubular body 5 itself

between two limit positions (illustrated in Figure 1). The regulation of the directionality of the bottom ventilation outlets 4 about the central axis 8 enables ventilation of an area that starts from the driver's toes and reaches as far as lapping the surface of the knee protection thus enabling the air to flow upwards "sticking" to the limit layer of the dashboard surface.

According to the embodiment illustrated in the attached figures, the ventilation outlets 4 are mounted in a fixed position on the side surface 7 of the tubular body 5, and the tubular body 5 itself is mounted so as to be able to oscillate about its longitudinal central axis 8. In this way, all the ventilation outlets 4 oscillate in the same way together with the tubular body 5 and about the longitudinal central axis 8 of the tubular body 5 itself.

According to a different embodiment (not illustrated), the tubular body 5 is mounted in a fixed position, and the ventilation outlets 4 are mounted on the side surface 7 of the tubular body 5 so as to be able to oscillate about the longitudinal central axis 8 of the tubular body 5 itself. In this way, each ventilation outlet 4 can oscillate about the longitudinal central axis 8 of the tubular body 5 in a way independent of the other ventilation outlets 4.

According to what is illustrated in Figure 1, the tubular body 5 is supported by a wall 9 of the passenger compartment 1 by means of interposition of a pair of bearings 10, which are fixed to two respective brackets 11 connected to the wall 9. Preferably, the bearings 10 are made in such a way that the oscillation of the tubular body 5 about its longitudinal axis 8 occurs

against a given force of friction, which is designed to maintain the tubular body 5 immobile in a given angular position in the absence of the action of external forces.

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According to what is illustrated in Figure 1, the tubular body 5 has one open end 12 in communication with the air-treatment unit 3 and one closed end 13 opposite to the end 12. The open end 12 is in communication with
10 the air-treatment unit 3 by means of a pipe 14, which is mounted in a fixed position and has one end slidably coupled to the end 12 of the tubular body 5.

Preferably, in a position corresponding to the open end
15 12, the tubular body 5 comprises a regulation member 15 designed to vary the size of the section of passage of the air between a minimum value (normally zero) and a maximum value.

20 According to an embodiment not illustrated, the tubular body 5 has a handle designed to be grasped by a user for imparting on the tubular body 5 itself an oscillation about its longitudinal axis 8.

25 According to what is illustrated in the attached figures, the tubular body 5 is arranged in a position corresponding to a set of pedals 16 of the vehicle, and is preferably arranged immediately behind a panel 17 of the passenger compartment 1 so as to be normally not
30 visible to the driver and/or to the passenger of the motor vehicle.

Fabrication of the tubular body 5 described above proves extremely simple and inexpensive. Furthermore, various
35 on-road tests have demonstrated that the tubular body 5

enables an effective and ergonomic regulation of the flows of air coming from the bottom ventilation outlets 4. In fact, regulation of the directionality of the bottom ventilation outlets 4 enables ventilation of an area that starts from the driver's toes and reaches as far as lapping the surface of the knee protection thus enabling the air to flow upwards "sticking" to the limit layer of the dashboard surface.